

Claims

[c1] 1. A two phase internal voltage generator, comprising:
a first phase internal voltage generator for providing a
first internal voltage source upon receiving an external
voltage source; and
a second phase internal voltage generator for providing
a second internal voltage source, the second phase in-
ternal voltage generator consumes relatively lower power
than the first phase internal voltage generator;
wherein as the second internal voltage source that is
provided by the second phase internal voltage generator
is steadied, the first internal voltage source that is sup-
plied by the first phase internal voltage generator is cut
off thereby.

[c2] 2. The two phase internal voltage generator as recited in
claim 1, the second internal voltage generator com-
prises:
a voltage pump generator, for pumping up voltage of the
external voltage source for providing a pumped voltage
according to a first control signal;
an input gate voltage generator, coupling to the voltage
pump generator, for stepping-down and regulating the

pumped voltage to an input gate voltage; and a power output circuit, coupling to the input gate voltage generator, for steadily providing the second internal voltage source according to the input gate voltage.

- [c3] 3. The two phase internal voltage generator as recited in claim 2, the first phase internal voltage generator cuts off the first internal voltage source supplied by the first phase internal voltage generator according to a third control signal.
- [c4] 4. The two phase internal voltage generator as recited in claim 3, wherein internal operating steps comprise:
 - the first phase internal voltage generator promptly providing the first internal voltage source as the external voltage source is received;
 - the first control signal being actuated, so as to activate the voltage pump generator to provide a pumped voltage;
 - the second control signal being actuated, so as to activate the input gate voltage generator to generate the input gate voltage as well as to activate the power output circuit to steadily provide a second internal voltage source; and
 - the third control signal being actuated, so as to cut off the first internal voltage source that is supplied by the first phase internal voltage generator.

[c5] 5. The two phase internal voltage generator as recited in claim 2, the power output circuit comprising a power transistor, wherein the gate terminal of the power output circuit couples to the input gate voltage, a first source/drain terminal power output circuit couples to the external voltage source, and a second source/drain terminal power output circuit outputs the second internal voltage source.

[c6] 6. The two phase internal voltage generator as recited in claim 5, wherein the power transistor is an NMOS power transistor.

[c7] 7. The two phase internal voltage generator as recited in claim 1, wherein the first phase internal generator comprises:
a comparator, for comparing a reference voltage and a feedback voltage, outputting a control voltage;
a power transistor, wherein the gate terminal of the power transistor couples to the control voltage, the first source/drain terminal of the power transistor couples to the external voltage source, and the second source/drain terminal of the power transistor couples to the first internal voltage source;
a first resistor, having a first terminal and a second terminal, wherein the first terminal couples to the second

source/drain terminal of the power transistor; and a second resistor, having a first terminal and a second terminal, wherein the first terminal couples to the second terminal of the first resistor so as to provide the feedback voltage, and the second terminal is grounded.

[c8] 8. A two phase internal voltage generating method, being applied to an integrated circuit having a first phase internal voltage generator and a second phase internal voltage generator wherein the second phase internal voltage generator consumes relatively lower power than the first phase internal voltage generator, the steps of the two phase internal voltage generating method successively comprise:

- a first internal voltage source being promptly provided by the first phase internal voltage generator upon receiving an external voltage source;
- an input gate voltage obtaining from stepping-down and regulating a pumped voltage that is obtained from pumping the external voltage source generated by the second internal voltage generator, and a second internal voltage source being provided according to the input gate voltage; and
- the first internal voltage source, supplied by the first phase internal voltage generator, being cut off.

[c9] 9. The two phase internal voltage generating method as recited in claim 8, wherein the second phase internal voltage generator comprises:

a voltage pump generator, for providing the pumped voltage that is pumped up from voltage of the external voltage source according to the first control signal;

an input gate voltage generator, coupling to the voltage pump generator, for stepping down and regulating the pumped voltage to the input gate voltage according to a second control signal; and

a power output circuitry, coupling to the input gate voltage generator, for steadily providing the second internal voltage source according to the input gate voltage.

[c10] 10. The two phase internal voltage generating method as recited in claim 9, wherein the first phase internal voltage generator cuts off the first internal voltage source supplied by the first phase internal voltage generator according to a third control signal.

[c11] 11. The two phase internal voltage generating method as recited in claim 10, wherein the steps successively comprise:

the first internal voltage source being promptly provided by the first phase internal voltage generating method upon receiving the external voltage source;

the first control signal being actuated, so as to activate

the voltage pump generator to provide the pumped voltage;

the second control signal being actuated, so as to activate the input gate voltage generator to output the input gate voltage as well as to activate the power output circuitry to steadily provide the second internal voltage source; and

the third control signal being actuated, so that the first internal voltage source supplied by the first phase internal voltage generator is cut off.